

CLAIMS

What is claimed is:

- 5 1. A switchable fluid control valve assembly for controlling flow of an hydraulic fluid therethrough to an apparatus, comprising:
 - a) means for providing flow of said hydraulic fluid therethrough in a first operating mode at a first and high hydraulic pressure;
 - b) means for regulating flow of said hydraulic fluid therethrough in a second operating mode at a second and lower hydraulic pressure; and
 - c) means for switching alternatively between said first and second modes.
- 10 2. A valve assembly in accordance with claim 1 wherein said means for switching includes means for reducing said first pressure to zero.
- 15 3. A switchable fluid control valve assembly for controlling flow therethrough at a first and higher hydraulic pressure and being switchable to regulate fluid flow therethrough at a second and lower downstream hydraulic pressure, the valve assembly comprising:
 - a) a housing having a longitudinal bore therein, said bore including a regulating chamber and a pilot chamber, said regulating chamber having at least a first fluid supply port for connection to a fluid source at said first pressure and a fluid control port for connection to an apparatus to be switchably controlled, and
 - 20 said pilot chamber having at least a second fluid supply port also for connection to said fluid source at said first pressure and a fluid dump port;
 - b) a regulating spool slidably disposed in said regulating chamber and having means for selectively eclipsing said first fluid supply port, said regulating spool having first and second opposed pressure faces;
 - 25 c) a pilot spool slidably disposed in said pilot chamber and having means for selectively eclipsing said second fluid supply port and having means for

selectively eclipsing said fluid dump port, said pilot spool further including means for selectively connecting said second fluid supply port with said regulating chamber;

5 d) regulating spring means for biasing said regulating spool toward a first extreme position in said regulating chamber;

e) pilot spring means for biasing said pilot spool toward a second extreme position in said pilot chamber; and

10 f) actuation means attached to said pilot spool for selectively positioning said pilot spool within said pilot chamber to fluidly communicate alternatively either said second fluid supply port or said dump port with said second pressure face of said regulating spool.

4. A valve assembly in accordance with Claim 3 further comprising an apertured separator fixedly disposed within said longitudinal bore to define a 15 boundary between said regulating chamber and said pilot chamber.

5. A valve assembly in accordance with Claim 4 wherein said regulating spring means and said pilot spring means are coil compression springs, and wherein said apertured separator defines a spring seat for each of 20 said springs.

6. A valve assembly in accordance with Claim 3 wherein said actuation means is a linear solenoid.

25 7. A valve assembly in accordance with Claim 6 wherein said solenoid may be energized to move said pilot spool to connect said second fluid supply port with said regulating chamber and may be de-energized to move said pilot spool to connect said dump port with said regulating chamber.

30 8. A valve assembly in accordance with Claim 3 wherein said first pressure face is opposed to said regulating spring means, the assembly further

comprising fluid communicating means connecting said first supply port with said first pressure face such that fluid flow through said fluid communicating means causes said regulating spool to be moved axially of said bore, thereby partially eclipsing said first supply port and reducing hydraulic pressure downstream of 5 said first supply port and causing said fluid to be provided from said valve assembly to said apparatus at said second and lower hydraulic pressure.

9. A valve assembly in accordance with Claim 8 wherein said fluid is engine oil.

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10. An internal combustion engine comprising a two-step valve activation mechanism having a switchable fluid control valve assembly for controlling flow of engine oil therethrough to the two step valve activation mechanism, comprising:

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a) means for providing flow of said oil therethrough in a first operating mode at a first and high hydraulic pressure to activate said two step valve activation mechanism;

b) means for regulating flow of said oil therethrough in a second operating mode at a second and lower hydraulic pressure to deactivate said two step

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activation mechanism; and

c) means for switching alternatively between said first and second modes.

11. An engine in accordance with claim 10 wherein said means for switching includes means for rapidly reducing said first pressure to zero.

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